Institute for Catastrophic Loss Reduction

CATtales

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Wildfires in Canada

Members of the Slave Lake wildfire review committee put their recommendations in context

By Peter Fuglem and Brian Stocks

While forest fires are ubiquitous across much of the Canadian landscape (an annual average of more than 7,500 fires and more than 1.9 million hectares burned over the past decade), many decades of successful fire suppression programs resulted in very limited impacts on communities during the latter half of the 20th Century.

However, the 2003 Firestorm in British Columbia caused substantial home and business losses in Kelowna and Barriere, and brought home to Canadians the fact that they were not immune to communities being directly impacted by wildfires.The 2011 events in the Slave Lake area only served to reinforce the message that many Canadian communities are similarly at risk, particularly as the wildland-urban interface continues to expand and fire activity across Canada is forecast to increase as a result of climate change.

This was a message stated clearly in the Canadian Wildland Fire Strategy (CWFS), developed in 2005 and supported by all provincial and territorial governments across Canada, along with the federal government. The CWFS recognized that increasing future fire activity and impacts were inevitable, and that Canadian governments needed to work closely, along with an informed and involved public, to lessen future impacts, particularly on exposed communities. Despite being signed by all governments, the CWFS has not been substantially implemented due to a lack of funding.

In recognition of the significance of the wildfires that ►

The view from here

Our collapsing infrastructure

By Paul Kovacs
Executive Director, ICLR

Our infrastructure is in poor health, and is frequently unable to provide the level of service that Canadians experienced in previous decades. Unhealthy infrastructure increases our vulnerability to natural disasters, and increases the effort required to recover after disaster strikes.

A consensus has emerged in recent years about the need to address our infrastructure problems. Indeed, in recent years there has been a welcome increase in infrastructure spending, including a significant investment in municipal infrastructure under the Government of Canada's *Build Canada* program. Unfortunately, a great deal of work remains. Professor Saeed Mirza of McGill University estimates that we will need to spend several hundred billion dollars.

The Federation of Canadian Municipalities has been pressing for many years for a commitment from the federal and provincial governments to address this issue. A first step, they argue, is to measure the extent of the problem. Some communities, like Edmonton, AB and Hamilton, ON have been leaders in building an inventory to assess local infrastructure, but most governments in Canada have little information. Once public infrastructure is put in place minimal effort is often taken to maintain, monitor and otherwise manage these systems.

Recently the Federation published the first report card on Canada's municipal infrastructure. For the communities that did provide information, almost one-third of the infrastructure was identified as in fair or poor health. I believe that the situation is likely worse in those communities that did not provide information. Many systems are approaching or have already exceeded their life expectancy. They are struggling to operate on a good day, and are particularly vulnerable if a disaster strikes.

British Columbia and the Government of Canada are making a large investment to protect our children by improving the resilience of schools to damage from earthquakes. Unfortunately the state of most schools across Canada is largely unknown, particularly their vulnerability to damage from earthquakes and severe weather. Similarly the state of many other public buildings, like hospitals, is not known. Many buildings were built several decades ago, before modern engineering knowledge had emerged about disaster resilient design and construction.

A lesson learned from elsewhere around the globe finds that transportation infrastructure is often vulnerable when disaster strikes. Severe wind, landslides and earthquakes can leave debris that blocks roads. Bridges, ports, airport runways, pipelines and rail lines can fail. Older systems are often the most vulnerable, and may take the longest time to rebuild after disaster strikes. Emergency response will be compromised when our transportation infrastructure can not operate. Recent flooding in southern Alberta, for example, closed off many bridges, roads and other essential transportation systems, hampering the management of the disaster.

Perhaps the most vulnerable systems are those buried under the ground. Drinking water, storm sewers, sanitary waste and many other systems were often put in place many decades ago, and are invisible because they are out of sight. They often come to the attention of elected officials only when they fail. Much of the longer-term challenges associated with Hurricane Sandy and the recent flooding in Calgary involve damage to buried infrastructure.

Telephone companies and electrical utilities frequently experience storm damage, and have demonstrated their capacity to respond and recover.

Widespread failure in municipal infrastructure is uncommon but can be very disruptive. The risk appears greatest for large hazards, including earthquakes, flooding and severe storms. Moreover, the risk appears greatest for older infrastructure put in place before development of modern engineering design and construction.

It is essential that those responsible for public infrastructure manage the systems with appropriate investments to maintain existing systems and replace older infrastructure. **CT**

ICLR and Desjardins retrofit a Quebec house to reduce the impact of earthquake and winter storm

By Glenn McGillivray
Managing Director, ICLR

On May 8, the Institute for Catastrophic Loss Reduction (ICLR) in partnership with Desjardins retrofitted a Quebec home to reduce the impact of winter storms and earthquakes. As part of the insurance industry's ongoing commitment to educate Canadian homeowners about disaster safety, ICLR once again chose Emergency Preparedness Week (May 5-11) to unveil its latest home retrofit project, this time in Quebec City, Quebec.

Glenn McGillivray, Managing Director of ICLR and Jocelyn Laflamme, Vice-president of Ratemaking and Business Solutions from Desjardins Insurance, conducted a media tour of the home. Said McGillivray: "Actions taken to make a home more resilient to natural catastrophes should reflect local hazard risk. Quebec represents one of three of the most seismically active areas in Canada. Additionally, the region is hit with several severe winter storms every year. Homeowners can prepare now for hazards that will inevitably strike in the future."

The Quebec home retrofit included:

- Installing snow melt cables on roof edges and gutters to prevent the formation of ice dams
- Applying safety and security film to windows
- Installing an electric surge protection system
- Installing an emergency generator with propane fuel tank
- Building a secure framing around the propane tank
- Installing a fire extinguisher
- Installing insulation around the main door
- Securing the hot water tank
- Securing cabinet doors
- Installing armoured supply hoses on the washing machine.

According to Natural Resources Canada, approximately 450 earthquakes occur in eastern Canada each year. Of this number, an average of four will exceed magnitude 4. There are two main earthquake seismic zones in the province of Quebec. The Western Quebec Seismic Zone is made up of a large area that encompasses the Ottawa Valley from Montreal to Temiscamingue, as well as the Laurentians and Eastern Ontario. The urban areas of Montreal, Ottawa-Hull and Cornwall are located in this zone. The Charlevoix Seismic Zone, located approximately 100 km downstream from Quebec City, is the most seismically active region of eastern Canada.

Quebec winters are often cold, windy and snowy with average highs of -5 to -8 ºC and lows of -13 to -18 ºC. Quebec City is one of the snowiest cities in Canada. On average, it receives 316 centimetres of snowfall each year. However, Quebec City experienced the heaviest snowfall on record in 1970-71 when it received 460 centimetres of snow. That record held until 2007-08, when the city was hit with just over 500 centimetres of snow. "Big" snowstorms of over ten centimetres a day occur, on average, nine times per year. According to McGillivray: "We can prevent natural hazards from becoming disasters if people undertake simple, appropriate preventative measures beforehand. Such actions and measures are affordable and take little time to do. That is what we want to demonstrate today in this home."

"At Desjardins, we are extremely happy to be involved in this initiative," noted Sylvie Paquette, President of Desjardins General Insurance Group, a member of ICLR. "ICLR's prevention work and annual awareness campaigns fit perfectly with our prevention message. We know that there are ways to significantly reduce the impacts of Mother Nature's whims on our homes. Often, when it comes to earthquakes, snowstorms, high winds, and similar events, we can take proactive measures to protect our property. ICLR's projects prove just that, and we want to help spread the word."

This is the eleventh year that Canada's insurers, through ICLR, have showcased a retrofitted home as part of Emergency Preparedness Week. The Institute has also retrofitted a community health centre, and has retrofitted child care centres across Canada as part of its "Protecting our Kids from Disasters" program. **CT**

Backwater valves and backflow preventers are not at all the same thing

By Glenn McGillivray
Managing Director, ICLR

It is very common to hear a backwater valve being called a backflow preventer or backflow prevention device and vice versa, but the two are nowhere near being the same thing. Using an incorrect term while giving a homeowner basement flood risk reduction advice could have far-reaching negative effects.

Where a backwater valve is used to describe a device designed to prevent sewer backup, a backflow preventer or backflow prevention device is designed to prevent contamination of a municipality's potable water supply.

A backwater valve is installed on the sanitary sewer lateral (and sometimes on the storm lateral as well) in the floor at the foot of the basement wall closest to where the lateral exits the house to connect with the municipal sewer system. The relatively simple device contains a gate that, when down, allows wastewater to easily exit the house. However, if forced up when the municipal sewer system surcharges – or backs up – the gate prevents waste water from re-entering the home and coming up through the floor drain, washing machine and/or basement plumbing fixtures such as sinks, toilets and showers.

A backflow preventer or backflow prevention device, on the other hand, is a device designed to prevent the unwanted reverse flow of water, solids or gases into a municipality's fresh water system. Murray E. McDowall, Master Plumber and Vice President of ProActive Water Solutions Inc. explains: "Backflow preventers (BFPs) are commonly found on drinking water systems throughout the province of Ontario, as well as the rest of Canada and North America. Their function is to ensure that whatever the drinking water system is connected to (fire sprinklers, irrigation systems, chemical mixers, boilers, etc) that the contaminant cannot flow back into the potable drinking water and be passed on through water lines to water consumers."

Photo of a mainline backwater valve designed to reduce the risk of basement flooding.

He continues "We don't refer to backflow preventers as a 'valve' due to its complex design (two independent shut-off valves, two independent spring-loaded check valves and, in some models, there may be yet another component by way of an integral relief valve). Due to all of these moving parts we recognize it as a 'device'."

There are several different types of backflow preventer with some providing a physical barrier to the backflow and others providing an air gap barrier.

Other terms often used incorrectly in lieu of backwater valve include 'check valve' and 'gate valve'. And while each is a legitimate term describing a particular device, none should be confused with a backwater valve.

To muddy the waters even more, local government water departments, building/ plumbing code documents and plumbers often use the term 'backflow prevention device' to refer to both backwater valves ►

A montage of various types and styles of backflow preventer or backflow prevention device, courtesy ProActive Water Solutions Inc. www.proactivewatersolutions.com

and backflow preventers. What's more, several Canadian municipalities have education and subsidy programs for both backwater valves and backflow preventers.

As such, if using the term 'backflow prevention device' in reference to basement flood risk reduction, it is imperative to qualify the term with the word 'sewer' – as in 'sewer backflow prevention device'.

When speaking of basement flood prevention, it is important to get the terminology correct, for several reasons.

A backflow valve won't prevent basement flooding

Simply put, while expertly developed and time-tested for ensuring a municipality's potable water does not get contaminated from various sources, a backflow preventer won't prevent basement flooding – it is not its intended purpose.

A homeowner installing a backflow preventer when what he or she wanted or needed was a backwater valve, could be in for a rude awakening.

Broker/insurers could be giving bad advice to their insureds

A professionally administered survey commissioned by ICLR some years ago indicated that homeowners not only preferred to receive – but expected to receive - loss control advice from their broker/insurer. As such, it wouldn't be a leap to conclude that insureds would also expect that such advice be accurate.

Advising an insured to install a backflow preventer rather than a backwater valve could result in the client spending a significant amount of money on something they may not have needed and may have never intended to buy, and they still would be faced with basement flood risk. And all because the wrong term was used.

Bad advice can cause a chain reaction of events…

Being improperly advised to install a backflow preventer rather than a backwater valve could very well set off a chain of negative events.

Virtually all brokers and insurers who offer loss control advice or who set out actions that homeowners must take in order for coverage to be continued leave it to the insured to find the necessary service providers to do any work that is required or suggested. An insured advised to install a backflow preventer would surely contact a plumber to get a quote and arrange for the work to be done. There would be no guarantee that the plumber would catch the error and correct the homeowner on his/her improper use of 'backflow preventer' over 'backwater valve'.

This could then prompt either the homeowner or the plumber to apply and pay for an incorrect plumbing permit with the local government. Again, there would be no guarantee that the error would be caught in time to avoid a big and costly mistake.

Then, if the homeowner is having the work done with the understanding that he or she will be partially or fully reimbursed through his or her municipality`s basement flood prevention subsidy program, the homeowner would discover that the wrong work was done and no reimbursement is forthcoming.

Similarly, the homeowner may contact his broker or insurer seeking to have his or her sewer backup coverage restored or asking for a premium reduction for having the basement flood risk reduction work done, only to find that the wrong device was installed and the risk remains.

Finally, it could be possible that the homeowner believes they have adequately addressed their basement flood risk when, in fact, they have not, giving them a false sense of security.

In this hurried, work-a-day world where people are constantly being barraged with information, insurers and brokers only have a limited time to grab a homeowner's attention on such loss control matters as basement flood risk reduction. Therefore they must ensure they don't squander their one chance to get the right message across. They must also ensure they don't open themselves up to liability and reputational risk in the process.

With regards to basement flood risk reduction - words matter. **CT**

Mark your calendar!

ICLR's 2nd basement flooding symposium

Thursday Sept. 19, 2013
Toronto Board of Trade
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A pair of career honours for Western/ICLR researcher

By Glenn McGillivray
Managing Director, ICLR

In the span of just a few weeks, Western University Professor and ICLR's Director of Engineering studies Dr. Slobodan Simonovic received two venerable lifetime achievement awards for his 30 years of work in the field of water resource engineering.

At the World Environmental & Water Resources Congress 2013 in Cincinnati, Ohio May 22, Dr. Simonovic was awarded the distinguished Ven Te Chow Award by the American Society of Civil Engineers. Established in 1995, "the award recognizes individuals whose lifetime achievements in the field of hydrologic engineering have been distinguished by exceptional achievement and significant contributions in research, education or practice."

The award citation reads: "For his outstanding contributions in the fields of water resources modeling and management, climate change-sensitive hydrologic engineering, systems, analysis and soft computing-based methods in hydrology, and for his extensive service to profession and education through publications and books."

"Ven Te Chow was a Professor who I had a chance to meet at the beginning of my professional carrier while working on a United Nations Development Programme project," explains Dr. Simonovic. "His influence put me on the path of water resources systems engineering. Being honored with an award named after him at the closing of my professional carrier is very hard to put into words."

Just a few weeks later, on June 20, Dr. Simonovic was inducted into the Canadian Academy of Engineering (CAE), one of the highest professional honours accorded to an engineer.

Members of the CAE are nominated and elected by their peers (current CAE members) to honorary Fellowship in the Academy in view of their distinguished achievements and career-long service to the engineering profession.

Dr. Simonovic received this recognition for his seminal contributions to the development of systems engineering approaches for the planning, designing and managing of complex water resources systems in the search for sustainable and robust physical and societal solutions, based on stakeholders' value systems and ethical principles. He has utilized probabilistic and fuzzy simulation and optimization for addressing subjective and objective uncertainties in managing water resources systems.

Dr. Simonovic is inducted as a Fellow of the Canadian Academy of Engineering in Montreal June 20.

Moreover, Dr. Simonovic has contributed to the solution of complex reservoir operations problems; developed effective flood management measures; improved assessment of climate change impacts on local scales; and developed decision support for integrated water resources management.

Dr. Slobodan P. Simonovic has over 30 years of research, teaching and consulting experience in water resources engineering. Along with his role as Professor in the Department of Civil and Environmental Engineering at Western, he serves as Director of Engineering Studies for ICLR. **CT**

Western University/ICLR's Dr. Slobodan Simonovic, centre, receives the Ven Te Chow Award at a ceremony in Cincinnati, Ohio May 22.

impacted Slave Lake and surrounding communities in May 2011, the Minister of Alberta Sustainable Resource Development (ASRD) established the Flat Top Complex Wildfire Review Committee in June 2011, of which we were members. The Committee was also supported by a team of wildfire experts who documented fire science and operational information related to the Flat Top Complex and provided technical advice.

The review was titled the *Flat Top Complex Review* as it encompassed the "fire complex" involving three fires that threatened the Slave Lake area. The review teams and Committee were formed shortly after the fires and quickly began work with on the ground data collection, as well as interviews with those involved in the firefighting response and stakeholders. Several important recommendations were made by the Committee to the Alberta government. But first, some context about the fires in the Slave Lake region in May 2011.

The "Flat Top Complex" in context

In mid-May of 2011 two high-intensity forest fires in central Alberta, driven by sustained strong winds under low relative humidity conditions, burned into a combined total of four communities (the town of Slave Lake, and the surrounding communities of Poplar Estates, Widewater and Canyon Creek). More than 500 homes and businesses were destroyed, with an estimated insured loss of $700 million. The social and emotional impacts of these fires are still being felt strongly within these communities two years later.

A number of key factors were identified as influencing the events of May 14 and 15, 2011. Foremost among these were the sustained and extremely high wind speeds which, in combination with low relative humidity values created very dry fine fuels and high intensity crown fire development, with prolific downwind spotting. Crown fires typically have flame lengths from the ground to above the tree crowns, and often involve significant spotting, which is the transport of firebrands ahead of the main fire front. Crown fires are nearly impossible to suppress with direct attack. The high winds also hampered air operations and led to the suspension of air attack during the critical fire period on the afternoon on May 15th. A very high fire load across much of Alberta during the mid-May period made adequate resourcing of wildfires a challenge.

During the May 11-15 period a large number of significant wildfires started across the province, with sustained strong winds creating major wildfire suppression difficulties. Initial attack and sustained attack resources were quickly committed, and additional national and international resources requested. A total of 189 wildfires occurred across Alberta during this period, threatening over 23 communities/ locations (e.g., camps, worksites, parks, wildfire lookouts).

In the Lesser Slave Area 52 wildfires occurred, threatening roughly 10 communities/ locations. The Richardson Fire north of Fort McMurray spread 70 kilometres north in two days, eventually burning nearly 600,000 hectares. Two Lesser ►

Slave Area wildfires were responsible for the damage to Slave Lake (Fire 65) and surrounding communities (Fires 56 and 65) started on May 14th. These fires, along with a smaller fire near Slave Lake that started on May 15th but had no impact on communities (Fire 82), were designated and managed as the Flat Top Complex.

Review recommendations

The Committee was charged with reviewing ASRD efforts before, during and after the wildfires, and met with key stakeholders and ASRD staff, along with experts in forest fire science and operations before issuing a report and recommendations in May 2012.

The Minister of the newly formed department of Environment and Sustainable Resource Development is developing an implementation strategy in response to the Committee's recommendations.

A number of key areas were investigated by the Committee including the long and short-term contexts of the Slave Lake event. Over the past decades, as mentioned, there have been several large fires potentially threatening Slave Lake and other communities. As a result, Alberta developed sophisticated wildfire response capabilities and a *FireSmart* program to reduce wildfire damage to homes and communities. In the weeks previous to the Flat Top Complex, the fire conditions in Alberta of extreme drying conditions in combination with the winds resulted in conditions for explosive fire growth over most of northeast Alberta.

The Committee considered this context as well as a broad range of potentially contributing factors. As a result seven themes with 21 recommendations were developed:

1. Wildfire prevention: the number of human-caused fires continues to increase in Alberta which adds to the challenge during extreme conditions. Enhancements in overall prevention of wildfires including industrial fires and with escalated measures during extreme conditions were recommended. In reviewing the *FireSmart* program, it is a significant challenge for most jurisdictions to maintain priority for FireSmart funding and community level activities. In some areas, it is also a challenge to obtain community acceptance and support for the program. This continues to leave many communities at risk in fire prone areas. The Committee recommended that a funding model be implemented that broadens engagement and a priority established to accelerate on-ground treatments.

2. Preparedness and capacity: Several challenges were experienced by response organizations in the period preceding and during the Flat Top Complex. The acceleration of fire activity across Alberta occurred at a time when many firefighters and aircraft were just coming online for start of season. Type 1 (highly trained) firefighters quickly became committed across the province. As homes came under threat both wildland and structure firefighters were committed to saving structures. The Committee recommended earlier start dates for resources and additional crews specialized in large fires. In order to anticipate and prepare for extreme conditions, capabilities to predict fire behavior were recommended as were advancing requests for assistance. The Committee also recommended a program to expand involvement of fire ►

departments in protecting structures using the existing mutual aid network.

3. Communications: in any fast moving emergency, communications with responders and stakeholders are critical but often challenging to manage. In that regard, the committee recommended standards and training for liaison staff, enhancements to weather advisories and support for new communications technologies. As well, under rapidly expanding response organizations, dispatch systems must be capable of handling the increased volumes of communications to support command and control. The committee recommended looking at options for enhancing Alberta's wildfire dispatch systems.

4. Organization and incident management: major events like the 2011 wildfire season test an organization and its priorities. The Committee recommended realignment of the reporting relationships for wildfire responsibilities to ensure direct lines of reporting, with regular internal assessments of strategies, priorities and procedures. As well, in the context of provincial emergency response, the Committee recommended a consistent implementation of both the Incident Command System and use of Incident Management Teams.

5. Post-wildfire business resumption: the SRD Area office and many staff were directly affected by the wildfires and associated events which significantly complicated the post-wildfire response and recovery. Given the importance of SRD operations during and following the event, there were many lessons to be learned. The Committee recommended a review of SRD business continuation plans to extend those learnings to future events.

6. Policy and legislation: policy and legislation are developed to deal with known conditions and expected situations. The 2011 wildfire season was well outside of the experiences of Alberta at the time its policies and legislation were last updated. The Committee recommended a review and appropriate update of relevant policies, procedures, acts and regulations and necessary updates to training and familiarization for staff.

7. Research and development: the 2011 wildfire season presented a number of key areas of potential new information for Alberta and other jurisdictions. The Committee recommended collaboration on research in a number of key areas, including factors contributing to fire spread and home losses, that will help prediction and prevention in the future. Another recommendation is to enhance the Presuppression Preparedness System with new information from 2011.

In addition to the recommendations, the team looked at the effectiveness of fire suppression activities over the period of ignition to containment of the Flat Top Complex fires. In the face of wide ranging opinions from the public and various experts, the Committee did not believe that alternative actions as discussed could have been safely implemented that would have guaranteed improved outcomes.

The wildfires of 2011 in Alberta and the 2003 fire season in British Columbia are considered by many wildfire experts to be a harbinger of an emerging new reality. Several factors are cited as likely contributors to a change in the risks to Canadian communities and residents in the wildland-urban interface.

Climate change is often seen as the primary driver; however, two other factors also appear to contribute. Increasing and expanding activity in Canada's wildlands amplifies the risk of fire starts and of investments being in the way of wildfires. Canada's forests and wildlands are changing as a result of historic wildfire exclusion so that our forests are aging especially around communities. This has exacerbated problems with forest health and increased flammability.

Wildfires will continue to make impressive and uncontrollable runs through Canadian wildlands. If the number and behavior of wildfires increase and development expands into wildlands, 2003 and 2011 type events will logically become more frequent unless significant collaborative actions are taken by all parties (government, stakeholders, public) to prepare for and to mitigate the risks.

Peter Fuglem and Brian Stocks were members of the Flat Top Complex Wildfire Review Committee. **CT**

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Mission
To reduce the loss of life and property caused by severe weather and earthquakes through the identification and support of sustained actions that improve society's capacity to adapt to, anticipate, mitigate, withstand and recover from natural disasters.

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